Science and Engineering Advisory Council 2004 Report

Members of the Science and Engineering Advisory Council (SEAC) spent 2004 discussing, researching, and writing about important issues affecting the work of scientists at Los Alamos National Laboratory (LANL, the Laboratory). They shared their findings with Laboratory leaders.

Among their primary issues of concern throughout the year were morale, communication, recruitment, and retention of scientists in difficult times. They brought to these issues the uniquely broad perspective of a group of staff members recruited from every scientific and technical division in the Laboratory.

During the course of the year, the group had several speakers on important topics.

- On March 9, 2004, Jim Porter, who was, at the time, the Laboratory's program manager for coordination with the University of California (UC), gave an overview of the history of UC management at the Laboratory. In general, he said that UC had managed its national laboratories in a decentralized manner—an approach similar to its style in managing its university campuses. Only in recent years, he said, had the UC Office of the President (UCOP) taken a more active role in Laboratory affairs. He indicated that UCOP seemed to be moving toward a more corporate-leadership-and-oversight role in managing the laboratory in Los Alamos. Porter also addressed student programs linking the Laboratory and the UC campuses.
- Laboratory Director G. Peter Nanos attended SEAC meetings twice—on April 6 to discuss a list of issues provided to him by SEAC (attached), and on August 31 to discuss the Laboratory stand-down and the state of the restart process.
- Lee McAtee, leader of the Health, Safety, and Radiation Protection Division, spoke May 4 on Integrated Work Management (IWM).
- Heidi Hahn of the Human Resources Division Office spoke May 18 on the Enterprise Project.
- David Watkins, leader of the Laboratory-Directed Research and Development Office (LDRD), spoke June 1 on the requirements, philosophy, and implementation of LDRD.
- Tom Bowles, the Laboratory's new chief science officer, visited SEAC on August 10 to describe his plans and activities. He returned on October 12 to ask SEAC to prepare a position paper on small-scale science at the Laboratory.
- Marc Clay of the Occurrence Reporting Group in the Performance Surety Division spoke November 9 on the tracking and interpretation of Laboratory occurrence trends for fiscal years 2002 through 2004.

SEAC members participated in several important ways in key Laboratory activities.

- At the request of then-Laboratory Deputy Director William H. Press, six of them met with the UC Academic Senate's Special Committee on National Laboratories on February 2 to discuss the SEAC viewpoint in supporting UC competition for the LANL management contract.
- Several SEAC members also met March 2 with the National Academy of Science (NAS) Committee on Management Criteria to Preserve the Excellence of Science at Los Alamos to discuss SEAC recommendations on the LANL management-contract request for proposals (RFP). They conveyed many of the issues addressed in SEAC's 2003 white paper for the Director entitled "What Should Be Included in the Laboratory Management Contract Request for Proposals" (attached)—a paper that also served as background and

input for a presentation that Press gave to the NAS committee January 22 in Washington, D.C..

- They provided Nanos with their list of concerns and issues affecting scientists at LANL.
- They provided comments on the Department of Energy (DOE) decision to conduct separate competitive bidding for the LANL and Lawrence Livermore National Laboratory management contracts (comments which LANL representatives carried with them to an important meeting at Livermore).
- They provided detailed, written comments to McAtee on a new Laboratory Implementation Requirements document (LIR) governing IWM.
- They offered to provide participants in testing of various components of the Enterprise Project.
- They met twice with UCOP's committee on environment, safety, and health, providing their viewpoint on the Laboratory stand-down and the subsequent restart.
- Near the end of the year, at Nanos' request, several of them were among those who met with DOE Secretary Linton Brooks to discuss the morale of LANL scientists in a year dominated by the contract competition and the stand-down.

SEAC produced several documents during the year. Although the council kept these documents short for maximum impact, each of them was the result of extensive, detailed, informed discussion of the issues involved. The documents were:

- a follow-up paper providing proposed metrics for measuring approaches suggested in a 2003 SEAC paper on what the LANL management-contract RFP process could do to guarantee the continued vitality and importance of science at LANL;
- the memo to Nanos, entitled "Suggested Issues and Topics for SEAC Consideration in FY04";
- a letter to McAtee on the IWM LIR;
- a white paper on suggestions for improvement of the LDRD process; and
- a paper on the "care and feeding" of small science at LANL.

In addition, on March 9, SEAC member Gary Rouleau wrote a rough draft outlining his own personal proposal for a two-week course that would alleviate his concerns about summer students and safety—concerns that now seem prophetic in light of the subsequent laser incident that cost a student part of her eyesight.

SEAC held more than 20 two-hour meetings during the year. Full summaries of 19 of those meetings (April through December) are available through Charmian Schaller, cosx@lanl.gov, a writer-editor in the Communication Arts and Services Group (IM-1) who wrote meeting summaries and maintained archives for SEAC during that time period. The documents that SEAC prepared in 2004 are attached to this report.

Attachments (7)

What Should Be Included in the Laboratory Management Contract Request for Proposals

Recommendations from the Science and Engineering Advisory Council

The Science and Engineering Advisory Council (SEAC) discusses issues that have an impact on science and engineering research and development at Los Alamos National Laboratory (LANL, the Laboratory). The council makes recommendations to the Laboratory Director on these issues to ensure continued success in the Laboratory's national-security mission.

The impending competition for the LANL management contract represents both an opportunity and a danger for the Laboratory's science and engineering effort, the core of LANL's capability to accomplish its national-security mission. The competition is an opportunity to increase support for the science and engineering effort. The danger is that such support could decline, ultimately leaving our nation more at risk.

The future management contractor must strongly support the Laboratory's scientific and technical effort—including development and maintenance of the Laboratory's capabilities, and fostering of the highest possible quality of research and development. The contractor must support excellent communication of the effort to stakeholders, to the scientific and engineering community, and to the public, maintaining the highest standards of integrity while safeguarding classified information. Because our nation depends on LANL for critical analyses and development of technology for its security, the contractor's support must be independent of pressures and interests, both political and commercial.

Recognizing our responsibility and commitment to national security, the SEAC respectfully but strongly recommends that the following elements be included in the science-and-technology component of the request for proposals (RFP) for the LANL management contract. The attachment to this letter elaborates on our suggestions, including measures by which the National Nuclear Security Administration might judge bids and bidders.

Technical Staff:

1. Recruit, hire, and retain the best-qualified people in the scientific and technical fields relevant to the Laboratory's mission.
2. Maintain scientific and technical excellence with support for (a) publication and peer review in refereed journals, including participation as journal editors; (b) attendance at, presentation at, and organization of seminars, conferences, and workshops; (c) membership and involvement in professional societies; and (d) joint appointments with universities and collaborations with universities and top members of the national and international scientific community.

3. Foster academic freedom, supporting sound technical conclusions and results, even if they are unpopular with the customer and regardless of political and economic pressures.
4. Provide for a collaborative environment, including a performance appraisal process, in which contributions toward mission success are rewarded over individual self-promotion.
5. Minimize the administrative burden on technical staff members.
6. Support the efforts of technical staff members to write proposals for new work and to explore issues related to projects.
7. Support teams of technical staff members who advise senior Laboratory management on Laboratory-wide science and engineering issues.

Administration:

1. Maintain strong high school, undergraduate, graduate, and postdoctoral employment and scholarship programs, both to provide for future staffing and to demonstrate public outreach. Support continuing employee-education programs that include advanced degrees.
2. Require the highest technical, scientific, and management skills for managers within technical divisions.
3. Support project and program peer review in forums that are open to the extent allowed by security requirements.
4. Negotiate effectively with customers to ensure and maintain a reasonable scope, schedule, and budget for every science and engineering program.
5. Develop and support an integrated and balanced portfolio of basic and applied research, taking full advantage of Laboratory Directed Research and Development opportunities.
6. Plan and implement long-term programs—an effort that requires a constant and effective presence of Laboratory personnel in Washington, D.C., both to monitor policy trends and to provide guidance in policy decisions.

Infrastructure:

1. Maintain modern infrastructure to support excellence in scientific and engineering research and in manufacturing facilities. Provide for and reinvest in the tools needed for research.
2. Maintain a high-quality library.
3. Provide for a safe, secure, and environmentally responsible workplace.
4. Support continuous modernization of nuclear-weapons-component manufacturing and handling facilities.

Specific Ways to Measure Achievement of Objectives

The items below repeat and elaborate on the elements we recommend for the science-and-technology component of the request for proposals for the Laboratory management contract. Measures by which the National Nuclear Security Administration (NNSA) might judge bids and bidders are listed as subitems. For these measures, programmatic support means accountable funding and effort expended with the express authorization and support of Laboratory management.

Technical Staff

1. **Recruit, hire, and retain the best-qualified people in the scientific and technical fields relevant to the Laboratory's mission.**
    - Number of awards and titles bestowed upon incumbent technical staff members by national science and engineering societies.
    - Number of technical staff members arriving and the number of technical staff members departing—correlated with their years of service before departure.
    - Number of refereed publications and citations identified with technical staff members arriving and leaving.
    - Number of patents and number of R&D 100 awards presented to incumbent technical staff members and identified with technical staff members arriving or leaving.
    - Amount of programmatic support for recruitment and retention activities.
2. **Maintain scientific and technical excellence with support for (a) publication and peer review in refereed journals, including participation as journal editors; (b) attendance at, presentation at, and organization of seminars, conferences, and workshops; (c) membership and involvement in professional societies; and (d) joint appointments with universities and collaborations with universities and top members of the national and international scientific community.**
    - Number of articles submitted and accepted for publication and the number of articles reviewed.
    - Amount of programmatic support for writing and reviewing.
    - Number of journal editors.
    - Amount of programmatic support for editorial efforts.
    - Number of technical staff members and the amount of effort (time and funds) devoted to attending seminars, conferences, workshops, and courses.
    - Amount of effort (time and funds, including support staff) devoted to preparing for seminars, conferences, workshops, and courses.
    - Number of memberships in professional societies.
    - Amount of involvement with professional societies (such as membership on committees and boards).
    - Programmatic support for involvement and membership (funding and promotion of membership).

- Amount of support for professional societies' activities—such as providing meeting space, material, and support staff, and establishing a policy supporting such use of government property.
- Number and diversity (variety of fields of study) of collaborations, number and diversity of participants, amount of effort (full-time equivalents [FTEs] spent on a collaboration's goals), and output.
- Number of off-site students mentored (not at the Laboratory but at the collaborating university) and the number of classes taught.

3. **Foster academic freedom, supporting sound technical conclusions and results, even if they are unpopular with the customer and regardless of political and economic pressures.**

   - Policy statements from potential contractors.
   - Documented instances of these policies being applied by management.

4. **Provide for a collaborative environment, including a performance appraisal process, in which contributions toward mission success are rewarded over individual self-promotion.**

   The environment should support both internal and external collaborations, including collaborations with multiple institutions.

   - Policy statements regarding the criteria for forming, reorganizing, and disbanding collaborations and teams and the criteria for recognizing the appropriate roles of management, teams, and individuals.
   - Policy statements regarding how teams are employed, managed, and assessed, including efforts to maximize productivity by means of teamwork and collaboration.
   - Demonstration or study of the effects of the performance appraisal system, including distinguished performance awards—for example, provision of a survey of the technical staff regarding the impact of the performance appraisal system on morale, motivation, and productivity.

5. **Minimize the administrative burden on technical staff members.**

   Perform cost-benefit analyses on existing and proposed rules and policies. Follow up with measurements afterward. This could be a part of a continuous quality improvement program.

   - Description of the process for measuring the administrative burden—for example, a survey of the technical staff.
   - Amount of overhead cost associated with support staff implementing rules and procedures.
   - Documented cost-benefit analyses on existing and proposed rules and policies, including measurements taken after implementation.

6. **Support the efforts of technical staff members to write proposals for new work and to explore issues related to projects.**

   - Amount of programmatic support for such efforts.
   - Number of proposals supported and success rate for these proposals.

- Discussion of staff transitions between projects, including the handling of transition difficulties such as staff members left dangling upon completion of a project.
- Amount of support for teams of technical staff members who advise senior Laboratory management on Laboratory-wide science and engineering issues.
- Provision of documented advice to senior management from such teams.
- Documentation showing the impact of such advice.
- Amount of programmatic support (in dollars and FTEs) for such teams.

Administration

1. **Maintain strong high school, undergraduate, graduate, and postdoctoral employment and scholarship programs, both to provide for future staffing and to demonstrate public outreach. Support continuing employee-education programs that include advanced degrees.**
    - Number and academic diversity (in majors and fields of study) of participants, and documentation of their output (degrees, conference papers and journal articles, citations, programmatic impact).
    - Amount of programmatic support for this activity (number of FTEs devoted to support and mentoring activities).
2. **Require the highest technical, scientific, and management skills for managers within technical divisions.**

    Facilitate and support movement of technical staff to and from management positions, providing a broad base of technical experience in management and management experience in the technical staff. Minimize administrative burden on technical management.
    - Discussion of technical background of management employees.
    - Amount of programmatic support devoted to training technical staff members for management roles.
    - Amount of programmatic support devoted to training managers to understand technical issues better, as well as the amount devoted to improving their technical management skills.
    - Documentation of the fraction of management attention devoted to technical as opposed to administrative issues.
    - Documentation on the migration of staff members between technical and management positions.
3. **Support project and program peer review in forums that are open to the extent allowed by security requirements.**

    This is the foundation for measuring and evaluating the Laboratory's technical output.
    - Number of reviews, types of review (internal vs. external, charters, independence), diversity (academic, industry, government, military, fields of interest), and experience (years of relevant work) of the participants.

- Number of opportunities for review panels to have candid discussions with the scientific and technical staff members.
- Frequency of dissemination of reviews to stakeholders (including the public, in many cases) to enable sponsors, funding agencies, and the public to assess how their money is spent and why.

4. **Negotiate effectively with customers to ensure and maintain a reasonable scope, schedule, and budget for every science and engineering program.**

   This effort includes negotiating effective policies under which the science and engineering programs are performed.

   - Policy statements from potential contractors.
   - Documented instances of the policy being applied at the program office and directorate levels.
   - Number of policies (from the NNSA, for example) improved or rescinded through negotiation.
   - Amount of programmatic effort (number of FTEs, for example) spent on such negotiations.
   - Amount of technical staff programmatic effort spent on accommodating oversight, measured by a survey of the technical staff, for example.
   - The number of delays, budget overruns, environmental safety and health incidents, and security violations that, after investigation, are found to be the result of unreasonable demands or expectations.

5. **Develop and support an integrated and balanced portfolio of basic and applied research, taking full advantage of Laboratory Directed Research and Development (LDRD) opportunities.**

   - Fraction of allowable LDRD funding spent.
   - The amount of effort spent on basic research (in FTEs and dollars) and the resulting output (in papers, programmatic impact, etc.).
   - A statement of the balance between research programs, justified by mission requirements.
   - Programmatic connections between applied projects and basic research efforts (for example, the fraction of project time or funding spent on basic research efforts that support the project and the Laboratory's science and engineering capabilities).

6. **Plan and implement long-term programs—an effort that requires a constant and effective presence of Laboratory personnel in Washington, D.C., both to monitor policy trends and to provide guidance in policy decisions.**

   - A statement of the approach taken to planning and implementing long-term programs and the staffing level proposed to monitor trends in Washington.

Infrastructure

1. **Maintain modern infrastructure to support excellence in scientific and engineering research and in manufacturing facilities. Provide for and reinvest in the tools needed for research.**

- Number of user facilities built and maintained (ranging from the Los Alamos Neutron Science Center to a scanning electron microscope laboratory).
- Number of users, amount of effort (in time), and funding expended by and at these facilities.

2. **Maintain a high-quality library.**
    - Convenience and utility of the library and its facilities and staff, measured by a survey of the technical staff, for example.
    - Amount of programmatic support for the library.
    - Amount of programmatic support for library improvements.

3. **Provide for a safe, secure, and environmentally responsible workplace.**

    The Science and Engineering Advisory Council is confident that these three issues are being addressed by others, but wants to emphasize that effective means to (a) identify, without fear of retaliation, and (b) proactively address these issues are important for the success of the science and engineering effort.

    - A statement of policy on the intent to maintain a safe, secure, and environmentally responsible workplace.
    - A statement of policy on protection of those who report problems.
    - Documentation of past experience in maintaining such an environment and protecting those who report problems.

4. **Support continuous modernization of nuclear-weapons-component manufacturing and handling facilities.**

    The Laboratory has maintained and should maintain a unique role in evaluating and developing process technology for the manufacturing and handling of nuclear weapons components.

    - Amount of programmatic support for the evaluation and development of process technology, which is sometimes called plant-directed research and development.
    - Impact of technological improvements on manufacturing and handling facilities in the nuclear weapons complex.

Suggested Issues and Topics for SEAC Consideration in FY04

In setting the agenda for the coming year, the Science and Engineering Advisory Council (SEAC) has identified a number of issues that impact technical staff members. SEAC is committed to providing assistance and making recommendations to address these issues, or other issues of interest to senior management, to enhance the quality of the work environment, retain and recruit the best people, improve morale and assure the continued high quality of Laboratory technical work.

1) Modernization of Laboratory Facilities
    a. Modern laboratory facilities to improve Laboratory technical work.
    b. Facilities kept up-to-date and in good repair promote pride, enhanced moral, and safety consciousness.
    c. Transportation: A good inter-lab transportation system would enhance technical teaming and collaboration between groups and divisions.
2) Recruitment and Retention of Staff
    a. Adequate funding for technical work with associated costs for administrative tasks.
    b. Rational strategy for institutional bridging or other mitigation of financial impact of postdoc-to-staff conversions on projects.
    c. Opportunities for unclassified, publishable research within the more heavily programmatic areas of the Laboratory. In the classified programs, some opportunity for researchers to pursue unclassified, publishable research to maintain standing in national and international professional societies.
    d. Valuing research on a par with programmatic work.
    e. Planning for generational succession and maintenance of institutional knowledge. Increase emphasis on mentoring.
3) Time and Effort
    a. Flexible work schedules that enable technical staff to tailor their work week to maximize efficiency and productivity.
    b. Report time at the end of the week to avoid time consuming T&E cost corrections.
4) Technical Considerations for the RFP for the Contract
    a. U C Faculty Issues with continuing NL contracts.
    b. Contingency planning for potential "brain drain" (either across the board or within key demographic groups) if a contract change adversely affects employment benefits (what happened at Sandia and ORNL?)
5) Morale
    a. Sabbatical Program similar to programs in industry (present situation makes sabbatical leave too risky. Sabbatical leave is a proven method of keeping technical skills sharp).
    b. Enhance job satisfaction, pride in the institution, value of the individual and their technical work.

    c. Measured responses to “incidents”, such that every incident does not become a lab-wide crisis.

6) How can the SEAC help in effectively implementing the IWM process and minimizing the impacts to the technical programs?
7) Can SEAC address any other issues that have arisen?

Discussion Draft: Summer Student Training Proposal

One of the most important things that a student should acquire after working here at the Lab is a sense of "**how to be safe**". Safety is important to everyone, so a student with a good knowledge of safety can carry the touch and spread the word on being safe. Students are the lifeblood of the Nation, by training them to be safe the Nation benefits as well. Safety training is not a university course, they expect us to do it, and so lets do it and do it well.

Safety should be "second nature" and second nature cannot be taught with a video, it should be hands on experience with instructors and mentors explaining and demonstrating. What I would like to propose is a new safety course for summer students; instead of the usual training the rest of us lab employees must face. Students going through the course should end up being able to analysis a hazardous situation, organize and plan walk arounds, know what to do in the case of an emergency and so forth. The course does not have to be long in length, two weeks would be sufficient. This way they are out helping and learning from all of us.

Some of the biggest and best complains and jokes I hear from students is about all the time wasted at training and learning nothing. They spend more than half their time at the lab in training. Lets train them properly and get them out helping us and learning. I am not saying that a two-week course will solve all of our problems, they will still need to be mentored, but at least they will start developing a sense of being safe.

As I can imagine it, each course could be 1 day long with the morning being for theory and the afternoon the practical. What is required from the lab, well some manpower, I can foresee volunteers helping with the practical, plus money as usual but not really that much since the gain would out weigh the cost. I am sure there are many staff members who would love to get back to teaching for a little while, if only to teach safety.

<u>Course layout</u>:

Introduction: 1 day

Instructor: Someone dynamic person to catch the students attention.

Outline: What the laboratory does and the hazards had we must face. The importance of being safe. What are OSHAW and the lab regulations? Their responsibility to be safe and the safety of others. Integrated work management, IWD, the law…

Physical Chemist: 1 day

Instructor: Someone from the Chemistry department.

Outline: What is an explosion? How they are caused? Prevention.
Working with glass, combustible gases, fumes and fume hoods…

Electrical: 1 day

Instructor: Someone from Electrical engineering

Outline: What is electricity? How it can kill? Grounding, PPE…

Mechanical: 1 day
Instructor: Someone from Mechanical engineering
Outline: Momentum, falling objects, Cranes and the cone of safety. Ladders, Lifting and pushing heavy objects…

Gases: 1 day
Instructor: Someone with a good knowledge of gas handling
Outline: The equations of pressure. How pressure can kill. Hooking up a gas bottle,

Radiation: 1 day
Instructor: Someone with a good knowledge of radiation safety.
Outline: What is radiation? Its hazards and causes on health. The benefits of radiation. How to be safe in a radiation zone. ALARA. The warning signs and sirens. PPE…

Environmental: 1 day
Instructor: Someone with a good knowledge Environmental issues.
Outline: What are toxins, how they damage the environment and people. How to dispose of waste, know what to dispose of and how…

Water: 1 day
Instructor: Someone with a good knowledge water systems.
Outline: A little chemistry on water. The potential to harm us, loose hoses, high pressure, electricity and water…

Medical responding: 1 day
Instructor: Someone with a good knowledge medical first aid.
Outline: CPR, defibulators, the law, maybe a little first aid, what to do in an emergency…

Ergonomics: 1 day
Instructor: Health professional
Outline: The hazards of doing things the wrong way. Carpal tunnel syndrome? Prevention, health issues, attitude, moral…

The above list maybe far from complete, but it is a start. Not every student may have to attend every class, but it will not hurt them to do so.

After the course is done does not mean the students can be left alone, but at least we know they are aware of the dangers that are out there and will know how to responded to it.

If the only the message we left the students at the end of the summer is that they know how to be safe, we have “succeeded” in a great mission that will go beyond the lab and benefit everyone.

POC Comments on IWM LIR

Submitted by the Science and Engineering Advisory Council (SEAC)

NOTE: Comments are included on both the LIR and on the JHA system.

1. This LIR treats all work at the laboratory the same. It is not easy for an IWM process to properly handle both scientific research and maintenance work under the same system. This became very apparent in reviewing the JHA system. See Comments 3 through 9.

2. The LIR needs to make it very clear that there is one IWD for each job. It also has to make very clear what a job is. One example of a job that ran into difficulties in this area is fire pump testing at LANL. That "job" involves KSL electricians, KSL mechanical people, KSL diesel mechanics and others KSL employees, plus two testers from FWO Fire. In this case, KSL had its own IWDs, and FWO-Fire had theirs. There was no IWD for the whole "job." There was no integrated pre-job briefing. The IWM process needs to make it more clear how to accommodate jobs with many different parties performing many different functions. This is very common at the lab.

3. One of the biggest problems with the new JHA system is that it seems to be written primarily for "jobs," that is, maintenance or construction work. It does not address scientific research very well. It is a very difficult to treat the daily work of research scientists and scheduled contractor maintenance under the same procedures. *If the JHA system is going to encompass scientific research, it has to coordinate better with the* ***process hazard analysis*** *side of work at the lab.*

   Examples of the kind of coordination that is needed include the following:

   A. Making it clear that process hazard analyses and hazard control plans are a part of the IWD for scientific work

   B. Attaching the PHAs and HCPs for scientific work

   C. Capturing the hazards and controls for scientific work in the JHA system

   D. Attaching hazard analysis checklists. Examples:
      - Fire safety review checklist (copy available on request)
      - Checklists for running experiments safely. Examples:
        - Handling flammables, pyrophorics, toxics, carcinogens, and other hazardous materials
        - Setting up and operate the process equipment that uses the gases
        - Determining safe temperature, pressure, voltage, and other ranges that should be maintained while running the equipment
        - Troubleshooting for common hardware and software events
      - Fire, wildfire, and explosion hazard checklists from the PR-ID system (Note: other lists from the PR-ID system could also be incorporated.)

E. Listing the applicable LIRs for the hazards involved. Examples: Pressure, cryogen, chemical, fire protection LIRs.

4. The data base entries on process (science/experimental) hazards seem to be quite sketchy and minimal. Either the data base info should be greatly fleshed out, or the role of PHAs and HCPs in the JHA system needs to be made much more clear and prominent.

5. In the JHA system, if you pick a hazard associated with scientific research/experimental work, like work with explosives, the system should generate a message if a job not usually associated with experimental work, like welding, is subsequently selected.

6. In the JHA system, if you pick a hazard associated with experimental work, like explosives, the system should generate *explosives* as one of the hazards that you must define controls for.

7. In the JHA system, subcontractors need to have separate questions. Not all parts of the JHA system will apply to them the same way as contractors or LANL employees.

8. The JHA system needs that ability to handle several rooms for the same job.

9. The JHA system needs a way to document analyses that result in rating the hazard low, thus not requiring an IWD.

Submitted July 15, 2004

Memo from the Science and Engineering Advisory Council to the Director Regarding Laboratory-Directed Research and Development

In setting the agenda for the year, the Science and Engineering Advisory Council (SEAC) identified the recruitment and retention of technical staff members at Los Alamos National Laboratory (LANL) as one of the key issues that confronts the Laboratory. Given recent events and the Laboratory-wide stand-down, this issue deserves renewed attention. Laboratory-Directed Research and Development (LDRD) may be an effective means of attracting the nation's best postdoctoral candidates and retaining young and midcareer scientists.

SEAC makes the following six recommendations:

1) Adjust the 2-to-1 ratio of Directed Research (DR) and Exploratory Research (ER) to increase the funding emphasis on small ER projects that could support early and midcareer scientists.
2) Earmark a portion of LDRD funds for technical staff members who have been at the Laboratory less than five years.
3) Improve alignment of the DR call for proposals with clearly expressed Laboratory strategic research goals while maintaining breadth in ER funding.
4) Provide increased transparency to improve the selection process. Communicate: who is making the decisions on funding; the criteria for selection; and the metrics used in evaluating proposals.
5) Require full disclosure on each proposal listing funded and pending research proposals and collaborations in the past five years.
6) Improve feedback on proposals; provide feedback that emphasizes the strengths and weaknesses of the proposed research.

The 'Care and Feeding' of Small-Scale Science at the Laboratory

Small-scale science at Los Alamos National Laboratory is vital to the nation because it is an essential part of a well-balanced science portfolio. Often it reveals extremely promising areas for future large-scale efforts. Small-scale science also provides an avenue for filling gaps in knowledge that hold back larger projects. It provides a means toward developing knowledge in classified areas and in areas so specialized and equipment-intensive that they are unlikely to draw academic interest. Above all, it is an invaluable retention and recruitment tool.

Small-scale science is exemplified by single-principal-investigator projects such as those funded through the Department of Energy Office of Science and Laboratory-Directed Research and Development. Certain forward-looking Laboratory programs also fund small-scale science in support of their missions.

Unfortunately, in the current Laboratory environment, small-scale science is endangered. Among the many factors that place small-scale science at risk are:

- One-size-fits-all taxation and bureaucracy
- Risk-aversion and fear of failure
- Inadequate funding, time, and resources
- Lack of institutional incentives
- Inadequate paths forward for successful small-scale projects
- The tendency of managers to look at the cost-benefit ratio and support large projects instead of smaller ones
- Lack of communication and coordination of parallel efforts

If small-scale science is to thrive at the Laboratory, it must be supported. The Science and Engineering Advisory Council makes these recommendations:

- Place small-scale science in a separate category and tax it at a lower Laboratory rate. (At present, small-scale science is taxed for Laboratory services that it does not need.)
- Encourage funding sources to accept reasonable intellectual risks, and then publicize and reward outstanding small-science projects.
- Increase funding and resources for small science. (For example, allocate a portion of the management fee to the support of small-scale science.)
- Increase the emphasis on intellectual achievement in promotion and salary considerations.
- Place more emphasis on transition plans in small-scale science.
- Reward managers for nurturing small-scale science.
- Establish a graduate-level university institute to provide a venue for small-scale-science collaborations and student education.

- Establish champions within the divisions and on the Executive Board who will effectively advocate improved funding for small-scale science and provide better communication and coordination.